

Applicant(s): Allan Scherr
Serial No.: 10/036,547
Filed: December 31, 2001

E30-050CON2 (96-031CON2)

REMARKS

This application now is pending with claims 18 through 32 that replace claims 1 through 13 and 15 through 17. Claims 1 through 13 and 15 through 17 are canceled. No claims are allowed.

Applicant requests reconsideration and reexamination of the above-identified application in view of the amendments made to the specification and claims. The following remarks state Applicant's bases for making this request and are organized according to the Examiner's Action by paragraph number in the Final Office Action.

Examiner's Action, Paragraph 1

The Examiner notes that amendments to claims 10 and 11 were confusing. On review Applicant realizes the remarks on page 6 of the prior amendment were not correct. The remarks should have read:

"This application is pending with claims 1 through 17. No claims were allowed. Claim 14 is canceled. Claims 1 through 13 and 15 are amended. Claims 1 through 13 and 15 through 17 remain in the application."

Newly submitted claims 27 and 28, that correspond to claims 10 and 11 are not identical. That is, claim 27 defines a B-tree cache management method as was originally included in claim 10;

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and claim 28, a charging cache management method. Applicant regrets any confusion that issue has caused.

Examiner's Action, Paragraph 2

The Examiner states the title of the invention is not descriptive and suggests a new title. Applicant adopts that suggested title.

Examiner's Action, Paragraph 3

The Examiner objects to certain portions of the Abstract of the Disclosure and makes several suggestions to overcome those objections. Applicant adopts those suggestions.

Examiner's Action, Paragraph 4

The Examiner has made several objections with respect to the drawings. Applicant is submitting concurrently an Amendment to the Drawings with respect to FIGS. 2a and 2b that incorporate certain changes. With respect to the last three objections regarding the labels "NO" and the inclusion of "DATA" after "LRU", Applicant is submitting a clean set of drawings that incorporate these changes. Consequently Applicant believes no further amendments should be required.

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Examiner's Action - Paragraph 5

The Examiner objects to the drawings because he feels they do not disclose each feature in the claims with respect to specific reference to "cache memory manager", "method storage means", "method selection means", "monitoring means" and "means for receiving commands". Applicant is attaching a proposed FIG. 1c as Attachment A. Applicant believes that this proposed FIG. 1c provides pictorially the information that is included in the description and is presented to satisfy the Examiner's objection. Applicant respectfully submits that no new matter is included. Specifically FIG. 2a provides a basis for each of the identified phrases. Each phrase is at most an alternative expression or name for structures and modules having different names, and such alternatives would be apparent to persons of ordinary skill in the art. Specifically, there is antecedent basis in the application as filed for the structure for performing the various functions. Therefore Applicant submits that these alternative descriptions or phrases do not constitute the addition of new matter. If the Examiner agrees, Applicant will submit an appropriate amendment to the Description and a formal drawing.

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Examiner's Action, Paragraph 5

The Examiner objects to certain portions of the specification. Applicant is correcting the specification accordingly.

With respect to page 5, Applicant has amended the specification to more clearly associate the trademark and the corporation for making the trademark system. Applicant believes that the Examiner's request to add (AOL) should not be required.

Applicant believes the reference to page 12, line 12 should be to page 12, line 4. The requested change has been made.

With respect to the objections to page 12, line 18 and page 13, line 12, Applicant believes those changes have already been effected.

Applicant has made all the other changes as suggested by the Examiner.

The Examiner also has several objections to the claims. Applicant has adopted the Examiner's suggestions.

Examiner's Action, Paragraph 6

The Examiner rejects claims 1 through 13 and 15 through 17 under 25 U.S.C. §112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the

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subject matter which Applicant regards as the invention. Specifically, the Examiner refers to language in claims 1 through 4 and 13.

Applicant believes that new claim 18, that is based upon claim 1 clarifies an intent to cover a single data node. However, the single data node is recited in the context of a network with at least two data nodes. New claim 18 provides clarification by indicating the transfers with the recited data node are with other data nodes. References to "other sites" are changed to "other data nodes".

Still referring to claim 1, the Examiner indicates that it is not clear what the "cache memory manager" is. New claim 18 indicates that each data node includes a cache management system and that the cache management system at the one data node includes a cache memory device and a cache memory manager. Within the context of the disclosure, the cache memory management system 10 in FIG. 1 is an example of the claimed cache management system. The storage units 14 in FIG. 2, that are devices such as Symmetrix DASD systems with, as known, both storage and control, are examples of cache memory devices. The control units 12 in FIG. 2, which can take any of several forms are examples of cache memory managers. Applicant believes that adopting the Examiner's suggestion of

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incorporating the phrase "cache management system" does clarify the claims and should overcome the Examiner's objection.

The Examiner also feels that the method by which the cache memory manager controls transfers "in response to" is not clear. New claim 18 indicates that the cache memory manager is responsive to a selected one of at least two different cache memory manager methods.

With respect to claim 2 the Examiner states that it is not readily apparent as to what the "method storage means" refers to or is not clear to what the "method selection means" refers to and how the different means are connected or related to other elements as set forth in the claims. As shown in FIGS. 1 and 2, a data node includes a cache management system at a local site. The cache management system includes both a control device 12 (i.e., a cache memory manager) and a storage device 14 as an example of a cache memory device. When such a cache management system is installed in a network, the specific storage location for the cache memory management methods is arbitrary. For example, if the cache memory device is implemented as a Symmetrix device, the different cache memory management methods might be stored in the "cache" or memory disks of that device. A particular data node might also include other hardware and software that could provide such a storage facility. In whatever form it will be apparent in the

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context of the claims there are different cache memory management methods and they need to be stored if different ones of these cache memory management methods are to be selected. Page 12 references the control device as being capable of executing software or firm ware implementations of the cache management system that would include the cache memory management memory methods. Reference to operating over a net whereby other discussions in the specification allude to the possibility of the cache memory management methods being stored at some place in the network and being executed through a web browser. Although all these are possible and will be apparent to a person of ordinary skill in the art, it is more likely that the cache memory management methods would be stored in the cache memory device at specially configured locations and potentially have a copy of the cache memory management methods in the "cache" of a device such as the Symmetrix DASDs. New claim 19, that is based on canceled claim 2, indicates that the selection means selects the method in the method storage means.

With respect to claims 3, 4, 16 and 17, Applicant's new corresponding claims 20, 21, 31 and 32 clarify the structure of the data node. Applicant believes that these new claims also clarify the interconnection of the elements.

The Examiner objects the use of various "means" elements. Applicant believes that the new claims and specification

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provide clear support and antecedent basis for the meaning of those terms.

The Examiner objects to claim 13 because the cache memory manager operates with "a method". There is no new corresponding claim.

With respect to new claim 30, that corresponds to canceled claim 15, the method storage means is essentially the same as in new claim 19. However, claim 30 further identifies specific cache memory management methods.

With respect to new claims 31 and 32, based upon canceled claims 16 and 17 respectively, the language is consistent with claims 20 and 21 and should overcome the Examiner's objection with respect to "monitoring means" and "means for receiving".

Examiner's Action, Paragraph 7

The Examiner rejects claim 13 under 35 U.S.C. §112 as failing to further limit the subject matter of a previous claim. Claim 13 is deleted. Claim 15 is amended to depend from claim 13.

Examiner's Action, Paragraphs 8 and 9

The Examiner rejects claims 1 through 6, 8 and 12 under 35 U.S.C. §102b as being anticipated by the previously cited Willick et al. reference (Willick article) or a Korner et al.

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reference (Korner article) each taken separately. Claim 13 is canceled. The Examiner further rejects claims 7 and 9 through 11 under 35 U.S.C. §103(a) as being unpatentable over the Willick or Korner articles.

Applicant respectfully traverses these rejections as they might be applied to corresponding new claims 18 through 29 that correspond to canceled claims 1 through 12.

Applicant has reviewed the Korner and Willick articles again and taken into consideration the Examiner's comments in the Final Office Action. Referring first to the Korner article, Applicant believes a fair reading of the Korner article defines the analysis of different caching algorithms, namely: an LRU (least recently used) algorithm, an "optimal" algorithm with precise knowledge of future operations and an "intelligent" algorithm. As Applicant understands it, in accordance with the Korner article requests for memory are grouped into three process specific partitions. Requests that would benefit most from an LRU caching algorithm are directed to a first partition. Requests that would be most favorably handled by the MRU algorithm are directed to a second partition. Other requests are sent to a third partition for which no caching algorithm exists. Thus within a single file different requests seem to be handled differently depending upon the nature of the access request.

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The Willick article discloses an analysis of five different caching algorithms. These include the LRU caching algorithm, a least frequency used (LFU) caching algorithm, a frequency based replacement (FBR) caching algorithm, a theoretically optimal replacement policy (MIN) caching algorithm and a random replacement (RAND) caching algorithm. The analysis compares the performance of each of these algorithms in a simulation using cache size as a variable. For example, in accordance with a first analysis involving no cache, the least frequency used caching algorithm seems inappropriate while the FBR and LRU caching algorithms seem comparable with temporal locality. Other analyses with increasing cache sizes show differences. The authors state that the goal of the research "was to investigate the suitability of various cache management strategies in the context of a network file server" (Page 9, Col. 1, first paragraph). They then seem to conclude at most that a network file server might operate with either the FBR or LFU caching algorithms depending upon client cache sizes.

Applicant believes that a person of ordinary skill in the art reading the Willick article without the benefit of the Applicant's disclosure would be led to a conclusion that only one or the other of the LRU or FBR algorithms should be used

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without opportunity to select between them on the same basis as set forth in the claims.

The Willick article refers to the Korner article, but looks at the intelligent caching algorithm in the Korner article as an alternative from the which the selection of an optimal disk caching algorithm might be applied to all systems. If in accordance with the Willick article the Korner article caching algorithm would be included, it would have the same construction as shown in the Korner article.

Applicant respectfully submits that new claim 18 is not anticipated by either the Korner or Willick article. Claim 18, in accordance with the preamble, describes a data node at different sites in a data network. Both the Korner and Willick articles disclose algorithms used at a file server. There is no suggestion of communications between different sites or different file servers. Claim 18 discusses the control of communications between the cache memory device and other data nodes in the data network. Further, claim 18 defines the system in which the cache memory management method at each of two data nodes is different. Applicant interprets the Willick and Korner articles if applied to a network as suggesting only that the same caching algorithm, albeit individually selected according to the requirements of the Korner and Willick articles, would be the same. That for example, if it were

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determined if the intelligent disk caching algorithm should be applied, it would be applied to all data nodes.

Applicant also respectfully submits that the differences between what is claimed and what is disclosed in either of the Korner or Willick articles would ^{not} be obvious to a person of ordinary skill in the art. First, Applicant sees nothing in these articles that discloses anything other than internal caching algorithms that operate at the direct disk access levels. That is, they operate with data transfers that occur between a host and a disk device. They do not operate with respect to communications between data nodes in a wide area or local network.

Even if the caching algorithm in the Korner and Willick articles were applied to such a network, nothing in them suggests any other implementation other than applying the same selected caching algorithm to each data node. That is, in the case of the Korner article, each data node would use the intelligent algorithm that moves data in a response to particular requests, but does not change the algorithm over time. In accordance with the Willick article there is a proposal to use one or two caching algorithms, but only one at a time and not for operations in which the caching algorithms are selectively utilized. Further, Applicant respectfully submits that any implementation of the information in the

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Willick and Korner articles would merely lead to a system in which all the data nodes use the same caching algorithm.

Neither article discloses the controlling of communications between data nodes. Neither article discloses a dynamic system as set forth in new claim 20 with monitoring means for monitoring operations in a node and a method selection means that responds to that monitoring means thereby to allow the cache memory management method to change. None of the references disclose any of the specifically claimed cache memory management methods.

Therefore Applicant respectfully submits that each of the claims defines a combination of elements that is new and that the differences between those elements and the disclosures in the Korner and Willick articles would not have been obvious to a person of ordinary skill in the art at the time Applicant made his invention.

If there are any questions, we urge the Examiner to call us collect.

Respectfully Submitted,



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